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## DIVERSITY, RELATIVE ABUNDANCE AND CONSERVATION OF CHIROPTERANS IN KAYAN MENTERANG NATIONAL PARK, EAST KALIMANTAN, INDONESIA

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### ABSTRACT

A study on understory bat species diversity and relative abundance by using mist nets was carried out in Kayan Menterang National Park, East Kalimantan, Indonesia in 2003. A total of 11 species of bats from three families and nine genera were captured using mist nets during 16 sampling nights. This represents approximately 12% of the total chiropteran fauna known to occur in Borneo. Capture rates were 72 bats per 100 net night. A total of seven species of pteropodid bat species, accounting for 91.6% of the total capture, were recorded in the forest understory. The most frequently caught species was *Cynopterus brachyotis* followed by *Aethalops alecto*, which comprised 58.9% and 16% of the total captures, respectively. A low relative abundance was observed for four entomophagous species, which represented by seven or less captures. The daily species accumulation curve showed no signs of leveling out, which may be confounded by the heterogeneous habitats between sites, suggesting that additional effort might yield more species of bats. As this study was concentrated mainly in the understory, additional trapping efforts and utilization of ultrasonic bat detectors and harp traps in the forest canopy and sub-canopy will be necessary to add more species to our recent findings.



# Diversity, Relative Abundance and Conservation of Chiropterans In Kayan Menterang National Park, East Kalimantan, Indonesia

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A study on understory bat species diversity and relative abundance by using mist nets was carried out in Kayan Mentarang National Park, East Kalimantan, Indonesia in 2003. A total of 11 species of bats from three families and nine genera were captured using mist nets during 16 sampling nights. This represents approximately 12% of the total chiropteran fauna known to occur in Borneo. Capture rates were 72 bats per 100 net night. A total of seven species of pteropodid bat species, accounting for 91.6% of the total capture, were recorded in the forest understory. The most frequently caught species was *Cynopterus brachyotis* followed by *Aethalops alecto*, which comprised 58.9% and 16% of the total captures, respectively. A low relative abundance was observed for four entomophagous species, which represented by seven or less captures. The daily species accumulation curve showed no signs of leveling out, which may be confounded by the heterogeneous habitats between sites, suggesting that additional effort might yield more species of bats. As this study was concentrated mainly in the understory, additional trapping efforts and utilization of ultrasonic bat detectors and harp traps in the forest canopy and sub-canopy will be necessary to add more species to our recent findings.

## INTRODUCTION

Bats under the order Chiroptera is the second largest mammalian group after Rodentia. Being the only mammal that have mastered the



technique of true flight has enabled them to utilise various habitat types including isolated islands (Hill and Smith, 1985, Mickleburgh *et al.*, 1992). Borneo is located in one of the highest bat biodiversity region in the world (Findley, 1992). There are 92 species of bats in Borneo, accounting to approximately 42% of the local land mammalian fauna (Payne *et al.*, 1985).

Distribution of records on bats in Kalimantan, Indonesia have been cited in van der Zon (1979), Payne *et al.* (1985), Corbet and Hill (1992) and Agustinus *et al.* (2002). However most of these available information were derived from reference specimen of bats from Museum Zoologicum Bogoriense, some in Western Australia Museum and most recently from the Universiti Malaysia Sarawak museum (Abdullah *et al.*, 1997).

Bats have been widely accepted to play an important role in genetic exchange and ecological maintenance of many types of forest ecosystem (Flemming, 1988; Elmqvist *et al.*, 1992; Gorchoy *et al.*, 1993). Megachiropterans or the fruit bats are important pollinators and seed dispersers in many parts of the world, especially in the tropics (Howe, 1984; Marshall, 1985; Boon and Corlett, 1989; Pierson and Rainey, 1992). Economically important plant species such as durian (Bombacaceae: *Durio zibethinus*) (Gould, 1977) and petai (Leguminosae: *Parkia speciosa* and *P. javanica*) (Baker and Harris, 1957) are pollinated by Megachiropterans. It is estimated that over 453 species of fruit plants and economically important trees in the tropical rain forest are related to bats (Marshall, 1986).

Fruit bats are also known to play a keystone role in structuring the forest community (Cox *et al.*, 1991; Rainey and Pierson, 1992) by dispersing pioneer species such as *Ficus* spp., *Solanum* spp. and *Piper* spp. Thus Megachiropterans execute an important role in the revegetation of cleared forest or disturbed areas (Flemming, 1988; Gorchoy *et al.*, 1993). The Microchiropterans or the insectivore bats play an important role in maintaining the insect population in the forest at equilibrium (Davison and Zubaid, 1992). It is therefore important to document the diversity and abundance of bats occurring in Kayan Mentarang National



Park (KMNP) in order to provide a baseline data and to facilitate monitoring and conservation of this diverse group of mammals.

This study was carried out to document the species diversity and relative abundance of bats in disturbed and undisturbed habitats in Kayan Mentarang National Park. The data will provide fundamental information for monitoring long term changes in relation with surrounding activities, for comparison with other national parks elsewhere in Indonesia and for future management planning purposes.

## MATERIALS AND METHODS

### Study Site

Kayan Mentarang National Park (N 04° 00' 3.1" E 115° 46' 20.7") comprises an area of 1.4 million hectares, where it is located along the political boundaries of East Malaysia, which encompass Sabah and Sarawak (Fig. 1). It is located in Malinau and Nunukan districts in East Kalimantan. It is the largest protected area in Borneo and the largest proposed Tran boundary protected area in South East Asia. A large amount of Kayan Mentarang National Park is above 1000 metres above sea level (a.s.l.), which provides an excellent habitat for sub montane small mammal species.

Generally the study areas were separated into disturbed and undisturbed area. The disturbed area includes fruit orchards and cleared land outside the Park. Tree species found in the disturbed habitat includes *Durio* spp., *Lansium* sp., *Ceiba* sp., *Musa* spp. *Artocarpus* spp., *Parkia* spp., *Mangifera* spp., *Nephelium* spp., and *Lansium* spp.. The main study area comprised Laban Sakai's cultivated area (LSCA1 & 2), base camp, sub-camps 1, 2, 3 and a small patch of Kerangas forest (Table 1). This protected forest also features a number of small, scattered small clearings, mainly utilized as shifting cultivation area.